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Opistognathus nigromarginatus Rüppell, 1830 (Perciformes, Opistognathidae), Bridled Jawfish: a first record from Malaysia

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Abstract
A specimen (125.5 mm in standard length) of bridled jawfish, *Opistognathus nigromarginatus* Rüppell, 1830 was collected from the Pulau Bidong, Terengganu, Malaysia using research trawler. *Opistognathus nigromarginatus* previously has been recorded from Southern Africa to the Persian Gulf, India, Thailand, and Vietnam. We document the first record of this species in Malaysia and the southernmost occurrence in the South China Sea and Western Pacific Ocean. Detailed morphometric and meristic data are presented along with brief diagnostic characters.

Keywords
Biogeography, distribution, marine fish, new record, range extension, South China Sea.

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Introduction

The Opistognathidae or jawfishes, a family belonging to the order Perciformes, has 88 valid species in four genera: *Anoptoplacus* Smith-Vaniz, 2017, *Lonchopisthus* Gill, 1862, *Opistognathus* Cuvier, 1816, and *Stalix* Jordan & Snyder, 1902 (Fricke et al. 2019; Froese and Pauly 2019). In the last decade, 16 new species have been described and undescribed species are likely to be discovered (Smith-Vaniz 2009; Fricke et al. 2019). Jawfishes are not common in Malaysia. Only four species, *O. alleni* Smith-Vaniz, 2004, *O. castelnaui* Bleeker, 1860, *O. dendriticus* (Jordan & Richardson, 1908), and *O. randalli* Smith-Vaniz, 2009, have been recorded, mostly along the east coast of Sabah, East Malaysia. The specimens supporting these records are not all catalogued in Malaysian museums (GBIF 2018).

Opistognathus, the most species-rich opistognathid genus, has 70 valid species which inhabit sandy and rubble bottoms in tropical and subtropical waters worldwide (Nelson et al. 2016; Fricke et al. 2019). Jawfishes are obligatory burrow dwellers and paternal mouth brooders (Smith-Vaniz 2011). They exhibit a similar appearance, behavior, and habitat to members of the Gobiidae and Blenniidae and are locally known in the Malay language as "ikan belontok laut" (meaning "sea large-goby fish") in conversation among local fishermen and divers.

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Figure 1. *Opistognathus nigromarginatus*, UMTF 8645, SL = 125.5 mm, Pulau Bidong, Terengganu, Malaysia.

A single specimen of an unidentified jawfish was collected during the fieldwork of a fisheries course near Pulau Bidong, Terengganu, in 2014. The specimen was identified as *Opistognathus nigromarginatus* Rüppell, 1830. As this species was previously only been known from Southern Africa to the Persian Gulf, India, Thailand, and Vietnam (Smith-Vaniz 2009; GBIF 2018), we report on the first record *O. nigromarginatus* from Malaysian waters. This is the southernmost record of this species in the South China Sea and Western Pacific Ocean.

Methods

We conducted a sampling survey of the fish diversity near Pulau Bidong using a bottom trawl on 3–5 September 2014. The trawl net was equipped with a cod end

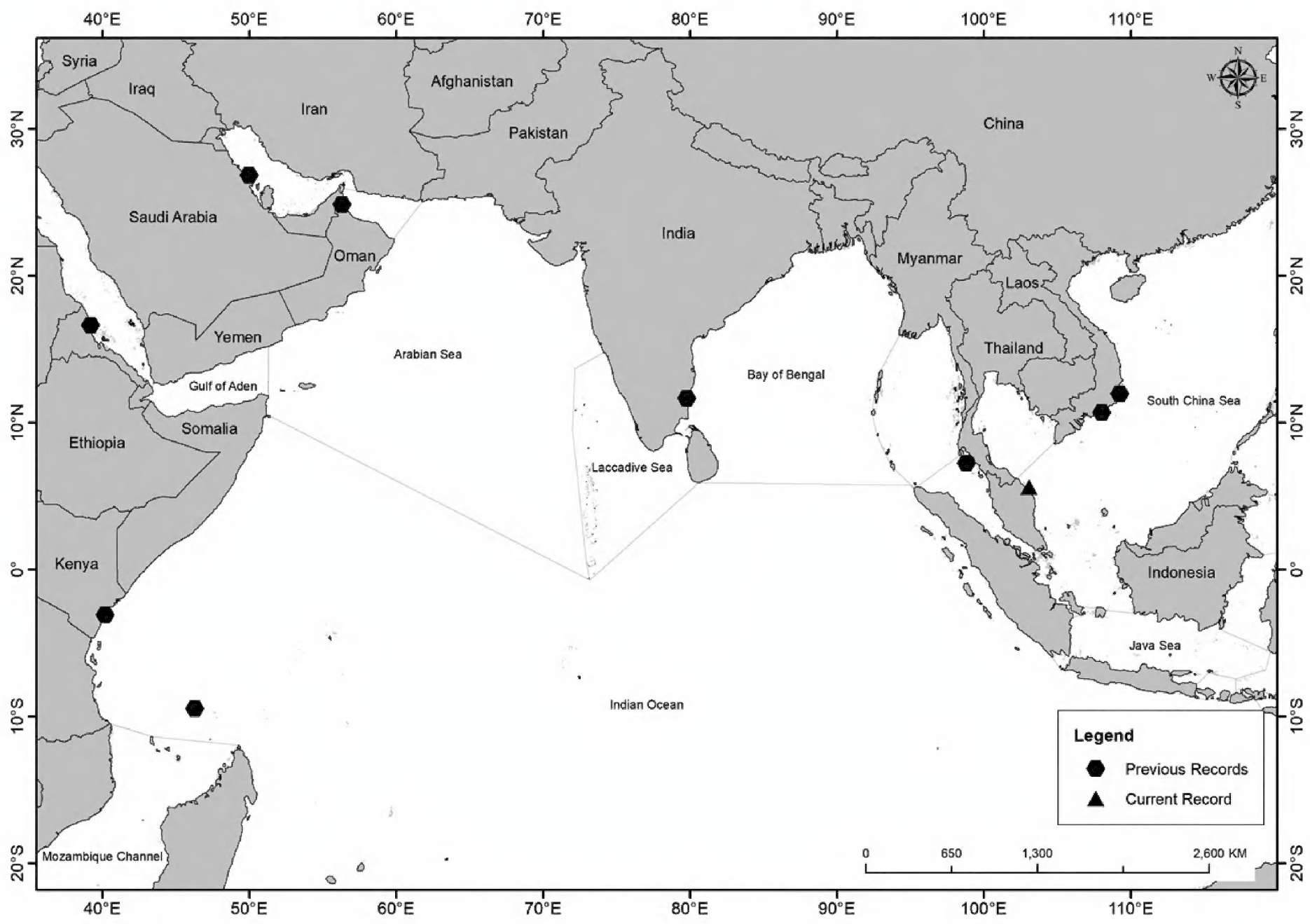

Figure 2. Map of Indo-West Pacific Ocean, showing previous records of *Opistognathus nigromarginatus* (hexagons) and the new record found in Malaysia (triangle).

mesh size of 38 mm. Each trawling lasted about 3 hours at a towing speed at about 3 knots. The procedure of fixation, photographing, and preservation of the specimen followed Seah et al. (2011). Methods of measurement and terminology of morphological descriptions are modified from Smith-Vaniz (2009). The specimen was measured to the nearest 0.01 mm using a vernier caliper. Morphometric measurements, such as total length and standard length (SL), are presented in millimeters, while other measurements are expressed as a percentage of either standard length or head length. The species was identified following Smith-Vaniz (2009). The specimen was deposited at the South China Sea Repository and Reference Center, Universiti Malaysia Terengganu, Malaysia (UMTF).

Results

Class Actinopterygii
Order Perciformes
Family Opistognathidae
Genus *Opistognathus* Cuvier, 1816

***Opistognathus nigromarginatus* Rüppell, 1830**
Figure 1; Table 1

New record. Malaysia: Terengganu: Pulau Bidong (05° 38′15.66″N, 103°08′01.68″E – 05°35′53.28″N, 103°09′ 05.16″E), Ying G. Seah (collector), 5 September 2014, 1 specimen (UMTF 8645, SL = 125.5 mm) (Fig. 2).

Identification. The specimen from Pulau Bidong, Terengganu, Malaysia was identified based on the following combination of characters, which matched the diagnostic features of *O. nigromarginatus* given by Smith-Vaniz (2009): body elongate; mouth large with relatively elongate upper jaws and the pointed posterior margin of maxilla produced as a thin flexible lamina extends to or beyond posterior margin of operculum; outermost segmented pelvic-fin ray not tightly bound to adjacent ray, and interradial membrane distinctly incised distally; dorsal fin XI, 14; body with about 68–95 oblique scale rows; and gill rakers usually 39–45; body uniformly yellowish brown, darker dorsally, pale ventrally with a prominent ocellus between fourth and eighth spinous dorsal fin; a pair of pale spots at basicaudal; inner lining of upper jaw and adjacent membranes with a single distinct black stripe that touches ventral margin of maxilla for most of its length. Detailed morphometric measurements and meristic counts are provided in Table 1.

Discussion

The presence of *Opistognathus nigromarginatus* in Malaysia was expected, as the species was previously been recorded from Southern Africa to the Persian Gulf, India, Thailand, and Vietnam (Smith-Vaniz 2009). Moreover, the coastal waters near Pulau Bidong have sandy and rubble bottoms associated with neighboring coral reefs which provide an ideal habitat for *O. nigromarginatus* to dwell in burrows. Our new record closes a gap in the

Table 1. Measurements and counts obtained from *Opistognathus nigromarginatus* collected from Pulau Bidong, northeastern Peninsular Malaysia.

Character	Present study	Smith-Vaniz (2009)
Total length (mm)	147.6	—
Standard length (mm)	125.5	90–155
Counts		
Dorsal fin spines	XI	XI
Dorsal fin rays	14	14–15
Anal fin spines	III	III
Anal fin rays	14	14–15
Caudal vertebrae	—	18
Total pectoral fin rays	40	39–42
Caudal rays		
Procurrent	9	8–10
Segmented rays	15	—
Branched segmented	13	12–14
Gill rakers		
Upper	14	13–16
Lower	25	23–29
Total	39	39–45
Oblique scale rows	86	68–95
Lateral line terminus position	5	4–8
As % of standard length		
Predorsal length	28.2	—
Preanal length	53.9	—
Prepectoral length	31.8	—
Prepelvic length	27.0	—
Dorsal fin base	69.8	—
Anal fin base	38.4	—
Head length	32.6	—
Pectoral fin length	14.2	—
Pelvic fin length	19.0	—
Caudal fin length	18.5	—
Body depth	22.8	—
Caudal peduncle length	10.5	—
Length 5th dorsal spine	13.3	—
Length 7th dorsal ray	15.5	—
Post orbital head length	18.6	—
Eye diameter	11.1	—
Upper jaw length	28.2	28-36
Post orbital jaw length	16.1	—
Snout length	5.7	—
Interorbital width	3.5	—
Caudal peduncle depth	10.0	—
As % of head length		
Pectoral fin length	43.6	—
Pelvic fin length	58.2	—
Caudal fin length	56.7	—
Body depth	70.0	—
Caudal peduncle length	32.2	—
Length 5th dorsal spine	40.9	—
Length 7th dorsal ray	47.5	—
Post orbital head length	57.0	—
Eye diameter	34.2	—
Upper jaw length	86.5	83–103.5
Post orbital jaw length	49.5	—
Snout length	17.4	—
Interorbital width	10.7	—
Caudal peduncle depth	30.6	—

range of this species between Phuket, Thailand and Nha Trang, Vietnam.

The new record of *O. nigromarginatus* is 980 km south of the previously known record in Vietnam and the southernmost occurrence in the South China Sea and Western Pacific Ocean. In addition, this species has been reported by divers at Semporna, Sabah, January, 2017, in an online citizen science database (Diveboard; https://www.diveboard.com) linked to GBIF (2018). However, there is no photograph included in that report and verification cannot be made. If this occurrence is included, *O. nigromarginatus* actually has a wider distribution that includes the Sulu Sea.

Opistognathus nigromarginatus is not common in Malaysian waters. The collected specimen was accidentally caught by a research bottom trawler during trawls that are usually carried out twice a year for fisheries science and ichthyology courses. The obligatory burrow-dwelling behavior of this group of fishes makes most jawfishes difficult to observe and capture except for the occasional trawl collection (Smith-Vaniz 2011). To date, the species of fish living along the continental shelf of Malaysia remain poorly known. Additional exploration of the marine fishes of Malaysia will lead to greater information on the biodiversity of Malaysia.

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Authors' Contributions

YGS and TNAMJ conceived the study. YGS, JNL, and AGM identified the species. YGS and STSAK collected the data. TNAMJ edited the photograph of the specimen. YGS and JNL wrote the manuscript and made measurements. All authors reviewed, finalized and approved the manuscript.

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